Unit 6: Representing and Comparing Fractions

In this unit students will gain understanding of fractions through sharing tasks and other contextual non-routine problem-types. Students need to utilize visual and concrete models including "The Fat Inch", number lines, rulers, Cuisenaire rods, and pattern blocks to explain their thinking. Focus instruction so that students gain deep understanding of crucial concepts:1) the size of the whole determines the size of the part and 2) Unit fractions Important Strategy: *Students need to connect the shaded models of fractions with the linear models (number lines and rulers)*

In this unit, students will:

• Develop an understanding of fractions, beginning with unit fractions.
• View fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole.
• Understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one.
• Solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.
• Recognize that the numerator is the top number (term) of a fraction and that it represents the number of equal-sized parts of a set or whole; recognize that the denominator is the bottom number (term) of a fraction and that it represents the total number of equal-sized parts or the total number of objects of the set
• Explain the concept that the larger the denominator, the smaller the size of the piece
• Compare common fractions with like denominators and tell why one fraction is greater than, less than, or equal to the other
• Represent halves, thirds, fourths, sixths, eighths, tenths , and twelfths using various fraction models

A common misconception, the idea that the smaller the denominator, the smaller the piece or part of the set, or the larger the denominator, the larger the piece or part of the set, is based on the comparison that in whole numbers, the smaller a number, the less it is, or the larger a number, the more it is. The use of different models, such as fraction bars and number lines, allows students to compare unit fractions to reason about their sizes.
Another misconception is that students think all shapes can be divided the same way. Present shapes other than circles, squares or rectangles to prevent students from over generalizing that all shapes can be divided the same way. For example, have students fold a triangle into eighths. Provide oral directions for folding the triangle:
1. Fold the triangle into half by folding the left vertex (at the base of the triangle) over to meet the right vertex.
2. Fold in this manner two more times.
3. Have students label each eighth using fractional notation. Then, have students count the fractional parts in the triangle (one-eighth, two-eighths, three-eighths, and so on).

For students to really understand fractions, they must experience fractions across many constructs, including part of a whole, ratios, and division. There are three categories of models that exist for working with fractions: area (e.g., 1/3 of a garden), length (e.g., ¾ of an inch), and set or quantity (e.g., ½ of the class). Partitioning and iterating are ways to for students to understand the meaning of fractions, especially numerator and denominator. Understanding equivalent fractions is also critical. Two equivalent fractions are two ways of describing the same amount by using different-sized fractional parts.

*adapted from Georgia Department of Education